

## **MICHIGAN WIND ENERGY STUDIES FOR DISCUSSION PURPOSES**

This paper provides a basic description of the ongoing Michigan Wind Energy Transmission Study, presently slated for January through June 2008. Comments and suggestions are invited.

**INTRODUCTION:** Recent Michigan and U.S. policy proposals for a possible state or national renewable portfolio standard (RPS), other energy policy changes, and possible global climate change initiatives have focused a lot of attention on the potential for wind energy development in Michigan. Additional interest has been fueled by the installation and start-up of Michigan's largest commercial wind installation to date, the John Deere/Wolverine Harvest Wind Farm project in Huron County. Plus, Michigan presently has over 2,000 MW of wind projects, in 14 different Michigan counties, listed in the MISO Interconnection Queue.<sup>1</sup>

As a result of all this recent interest, policy makers are asking questions like these: Is there enough wind in Michigan to support an RPS of a specific percentage by a specific year? Is there enough land area where wind resources can be developed, without running into serious siting problems, land use conflicts, and widespread public opposition? How high can or should an RPS goal be, before it will raise renewable resource costs by pulling too hard on a market that has just started to develop?

And, explicitly for the purposes of this project, policy makers are asking questions like these: Can the Michigan electric grid accommodate this much new wind energy development? How much grid expansion will be necessary to accommodate planned Michigan wind developments? How should grid improvements be scheduled and made? And, who will pay for those grid improvements?

Because of all this interest, the Michigan Wind Working Group and Michigan's electric transmission owning companies and electric utility companies agreed to work together cooperatively to complete one or more studies needed to help answer such questions.

An organizing meeting was held at MPSC offices in Lansing, on December 14, 2007. The purpose of that meeting was to: (1) solicit input from all interested parties on the design and scope of one or more studies; (2) begin organizing an advisory team to provide oversight for such studies; and (3) further develop plans about how to proceed to pursue this work. All interested parties have been invited to share their thoughts about this project at any time, either via participation in any of the public meetings that will be scheduled as this project progresses or by written or oral communications with any of the study participants. An email distribution list is being established for this purpose.<sup>2</sup>

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<sup>1</sup> MISO Interconnection Queue data. December 17, 2007.

<sup>2</sup> See [http://www.michigan.gov/mpsc/0,1607,7-159-16377\\_47107\\_48701---,00.html](http://www.michigan.gov/mpsc/0,1607,7-159-16377_47107_48701---,00.html).

The immediate goal is to complete, as quickly as possible, descriptions of the study or studies, and establish plans for who will perform the required work and when that work can be completed. To the extent that new sources of funding, staffing, or other resources must be identified in order to complete that work, the immediate goal is to clearly identify and quantify all necessary additional resources and specify how they will be utilized.

What follows is a preliminary concept for this work, which has been developed by MPSC MREP staff after some consultation with a few interested parties. This is being shared with the MREP and Michigan Wind Working Group WINDSTUDY distribution list, with the intent of gathering additional ideas prior to finalizing this document.

**WHAT THIS STUDY IS NOT:** Before explaining further, MPSC MREP Staff wants to clearly point out that this study is not intended to provide a detailed plan for Michigan wind energy development. Rather, it proposes a fairly high-level and general overview of various plausible scenarios, intended to bracket something like low, medium, and high rates of wind energy development in Michigan over the coming 25 to 50 years or so. It will provide a best-educated approximation of transmission grid upgrades associated with some hypothetical wind development scenarios.

This study will not provide information about siting specific wind projects (sometimes referred to as “micro-siting”). This study will not provide information about specific transmission grid system upgrades that may be required for any specific wind farm installation in Michigan. It will not supplant feasibility and system studies that are completed for transmission interconnection requests filed with the Midwest Independent System Operator (MISO), but it is hoped that work associated with ongoing transmission interconnection requests might provide useful insights and possibly work that can be utilized in completing the more general and higher-level study proposed here.<sup>3</sup>

## STUDY OUTLINE

1. A Michigan WINDSTUDY working group is formed, comprised of volunteers, to provide advice and data inputs for this study. This has been done already, although anyone is welcome to join the working group at any time.
2. The WINDSTUDY Team will attempt to form a consensus on quantities, locations, and timing of wind energy developments to be studied.
  - 2.1. Identify likely low, medium, and high wind energy production estimates for Michigan from now through 2030 or even 2050. The team will be responsible for the development of estimates for Michigan wind energy development. Those

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<sup>3</sup> Most, but not all of Michigan’s geography falls under the MISO operational footprint. You can learn more at the MISO website, <http://www.midwestiso.org/page/Generator+Interconnection>. The MISO Interconnection Queue presently includes two dozen Michigan wind projects in 14 Michigan counties, totaling nearly 2,900 MW. Queue listing does not ensure a completed project will develop, but it does indicate significant interest.

estimates will become input for the remainder of this study. Those estimates will incorporate and be guided by:

- 2.1.1. RPS proposals (e.g., 10% by 2015, 20% by 25, 25% by 25, 20% of U.S. total electricity from wind by 2030?).
    - 2.1.1.1. Investigate variations in the need for wind generation to meet the various RPS proposals using 50 to 95 percent wind, based on energy?
  - 2.1.2. Identification of likely early, medium, and later locations for wind energy development. Obtain input from NREL, Michigan Wind Working Group, wind developers, Michigan electricity suppliers, and MISO queue.
  - 2.1.3. Exclusion zones for all varieties of incompatible land uses.
  - 2.1.4. Best available data on wind power availability (from NREL, etc.).
  - 2.1.5. Coordination with U.S. DOE/Windpowering America studies.
  - 2.1.6. Coordination with current and proposed studies for possible off-shore wind energy development in the Great Lakes.
  - 2.1.7. The possibility of Michigan becoming a producer of wind energy for export to other states and countries.
3. Using the data provided by the WINDSTUDY team as input, Michigan transmission owning companies (ITC and ATC) will perform preliminary system modeling to determine, roughly and generally speaking, what transmission grid upgrades and expansions would be expected to be necessary to accommodate the quantities, locations, and timing of wind development identified. This analysis should include, to the extent possible, considerations of:
    - 3.1. already existing planned and/or scheduled transmission system upgrades and expansions.
    - 3.2. “distributed” versus “transmitted” wind. – To what extent will it be helpful to model utility scale machines installed in large clusters (e.g., >20 MW “farms”) versus smaller clusters (<20MW?). To what extent might medium scale (e.g., roughly 250 to 1,250 kW), or small scale (e.g., roughly 1 kW to 250 kW) wind generators be employed, and how would that effect modeling, if at all?
    - 3.3. geographic diversity and temporal diversity of wind resources. (The WINDSTUDY team will provide the best available wind-energy data to help with this analysis.)
    - 3.4. use of potential energy storage facilities and techniques, including Michigan’s 1,800 MW, Ludington pumped storage facility.
4. Impacts and outcomes:
    - 4.1. general ideas about transmission upgrades and associated expenditures
    - 4.2. general ideas about likely utility rate impacts associated with the modeled wind developments (both transmission rates and generation rates)
5. Other Possible Studies and Publications to Consider for WINDSTUDY development in 2008 and beyond. What is the sequence of reports that might come out of this

process, where we might consider this proposed transmission study to be step one? What are the possible/preferred/likely following steps? For examples:

- 5.1. Guidelines? Handbooks? For wind developers? For communities? Siting/zoning?
- 5.2. Public process education, decision-making?
- 5.3. What are the economic impacts and tax revenue implications of the modeled wind energy scenarios?
- 5.4. What are the similarities and differences in transmission planning for biomass, hydro, solar, other renewables? Non-renewables?
- 5.5. Siting research? Data needs?
- 5.6. MISO Balancing Authority? W/ancillary services market starting June 1, 2008?
- 5.7. How is this Michigan study related to the MISO MTEP process? The U.S. DOE Eastern Interconnect study? Midwestern Governors Association goals and objectives from the November 2007 Energy Summit?

## PROJECT HISTORY

A first meeting on this subject was held at MPSC Offices in Lansing on Friday, December 14, 2007.